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ABSTRACT

A promising new teacher self-efficacy instrument, the Ohio State Teacher Efficacy Scale (OSTES) (M. Tschannen-Moran and A. WoolfolkHoy, in press) was critically evaluated regarding its development and submitted to confirmatory factor analysis (CFA). Participants were 183 inservice teachers in Texas and Washington, DC, most of whom taught primary grades. The hypothesized three-factor structure was not supported by the CFA, but a two-factor correlated structure was retained, which consisted of the Efficacy in Student Engagement and Efficacy in Instructional Practices factors. The third factor, Efficacy in Classroom Management, was eliminated in the strongest two-factor model. Recommendations are made to: (1) further refine the OSTES by removing the third factor; (2) seek increased use of CFA methodology in teacher efficacy instrumentation and (3) foster stronger exploratory factor analytic strategies, particularly regarding factor retention. The instrument is attached. (Contains 2 tables, 5 figures, and 51 references.) (SLD)

Running head: CFA of the OSTES

A Confirmatory Factor Analysis of a New Measure of Teacher Efficacy: Ohio State Teacher Efficacy Scale

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Abstract

A promising new teacher self-efficacy instrument, The Ohio State Teacher Efficacy Scale (OSTES; Tschannen-Moran & Woolfolk Hoy, in press), was critically evaluated regarding its development and submitted to confirmatory factor analysis (CFA). The hypothesized three-factor structure was not supported by the CFA, but a two-factor correlated structure was retained, which consisted of the Efficacy in Student Engagement and Efficacy in Instructional Practices factors. The third factor, Efficacy in Classroom Management, was eliminated in the strongest two-factor model. Recommendations are made to (a) further refine the OSTES by removing the third factor, (b) seek increased use of CFA methodology in teacher efficacy instrumentation, and (c) foster stronger exploratory factor analytic strategies, particularly regarding factor retention.

A Confirmatory Factor Analysis of a New Measure of Teacher Efficacy: Ohio State Teacher Efficacy Scale

As observed by Tschannen-Moran (2000), "Teacher efficacy is a little idea with big consequences. . . [teacher efficacy] has been found to have powerful effects" (p. 2). Henson, Kogan, and Vacha-Haase (in press) also noted that "Perhaps one of the best documented attributes of effective teachers is a strong sense of efficacy." Consistent with Bandura's (1977, 1982, 1996) general formulation of self-efficacy, Tschannen-Moran and Woolfolk Hoy (in press) defined teacher efficacy as a teacher's "judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated." The idea that these self-judgments impact teacher behavior and student learning has received considerable attention (and empirical support) in the literature since its introduction in the late 1970s.

Researchers have repeatedly related teacher efficacy to a variety of positive teaching behaviors and student outcomes (cf. Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Teacher efficacy is positively related to achievement (Ashton & Webb, 1986; Moore & Esselman, 1992; Ross, 1992), students' own sense of efficacy (Anderson, Greene, & Loewen, 1988), and student motivation (Midgley, Feldlaufer, & Eccles, 1989). Teachers high in efficacy

tend to experiment more with methods of teaching to better meet their students' needs (Guskey, 1988; Stein & Wang, 1988). Among other things, efficacious teachers plan more (Allinder, 1994), persist longer with students that struggle (Gibson & Dembo, 1984), and are less critical of student errors (Ashton & Webb, 1986). While a comprehensive review of the correlates of teacher efficacy is beyond the scope of this article, the reader is referred to Tschannen-Moran et al. (1998) for a thorough treatment.

While the study of teacher efficacy has borne much fruit, the meaning and the appropriate methods of measuring the construct have become the subject of recent debate (Tschannen-Moran et al., 1998). This dialogue has centered on two issues. First, based on the theoretical nature of the self-efficacy construct (Bandura, 1977, 1996), researchers have argued that self-efficacy is best measured within context and about specific behaviors (see e.g., Pajares, 1996). Second, the construct validity of scores from a variety of instruments purporting to measure teacher efficacy and related constructs has come under significant fire.

Coladarci and Fink (1995); Guskey and Passaro (1994); Henson (2001); Henson et al. (in press); Roberts, Henson, Tharp, and Moreno (in press); and Tschannen-Moran et al. (1998) provide thorough discussion of this debate. Therefore, the issues will not be revisited here except to note that the traditional instruments used in the measurement of teacher efficacy (e.g., Teacher

Efficacy Scale [Gibson & Dembo, 1984], Science Teaching Efficacy Belief Instrument [Riggs & Enochs, 1990]) have been theoretically confused and generally not reflective of Bandura's (1996) social cognitive theory conceptualization of self-efficacy. Furthermore, there has been considerable debate as to whether teacher efficacy is a unidimensional construct or best represented by some multidimensional model.

In effort to bring some coherence to the meaning and measure of teacher efficacy, Tschannen-Moran et al. (1998) presented a multidimensional theoretical model of efficacy. This model has garnered some limited preliminary support (cf. Goddard, Hoy, & Woolfolk Hoy, 2000; Henson, Bennett, Sienty, & Chambers, 2000) and has sparked the development of new measures of teacher efficacy that purport to honor Bandura's (1996) conceptualization of self-efficacy. Two of these instruments include the Collective Teacher Efficacy Scale (CTES; Goddard et al., 2000) and the Ohio State Teacher Efficacy Scale (OSTES; Tschannen-Moran & Woolfolk Hoy, in press).

While recent advances in instrumentation are important in the development of teacher efficacy research, use of these and other related instruments (e.g., Self-Efficacy Teaching and Knowledge Instrument for Science Teachers [Roberts, Moreno, & Henson, 2000]) must undergo reasonable scrutiny before their use in the literature is too firmly established. For example, Henson

(2001) described the inappropriate use of the Teacher Efficacy Scale (TES; Gibson & Dembo, 1984), historically the predominant teacher efficacy instrument, despite inherent weakness. Henson noted:

> . . . the TES suffered from numerous psychometric infirmities, but found its way into, and entrenched in, the research literature nonetheless. Because of the exciting possibilities and compelling early results of teacher efficacy research, the TES was quickly adopted. It was, after all, published in a leading journal and was developed through recognized and respected methodologies. Unfortunately, the theoretical and psychometric weaknesses were overlooked, and researchers of teacher efficacy prematurely foreclosed on the instrument's developmental identity. (p. 13)

The essential problem stemmed from the fact that the TES was never tested empirically beyond its original validation study until a decade after its introduction. This is true despite Gibson and Dembo's (1984) call for continued psychometric assessment of their newly developed instrument. In their recommendations for future research, they suggested that "construct validation should continue to be investigated across different populations and settings. Further factor analytic studies, including use of LISREL [or, confirmatory factor

analysis] procedures, should be used to confirm further the trait and factor structure" (p. 579). In the spirit of this recommendation (and in spite of its lack of impact regarding the TES) new instruments of teacher efficacy must be examined for theoretical and psychometric integrity, lest they too become prematurely entrenched in the research literature and create additional confusion in teacher efficacy research.

Therefore, the purpose of the present paper is to empirically examine the psychometric integrity of a promising new instrument of teacher efficacy: The Ohio State Teacher Efficacy Scale (Tschannen-Moran, 2000; Tschannen-Moran & Woolfolk Hoy, in press). The OSTES was developed based on the theoretical model proposed by Tschannen-Moran et al. (1998) and represents an important advancement in the field. Specifically, the present paper will (a) critically examine the initial development of the OSTES and (b) present results from a confirmatory factory analysis study conducted to test hypotheses regarding the factorial structure of the instrument.

Method

Development and Critique of The Ohio State Teacher Efficacy Scale

Based on their theoretical model and the advice of Pajares (1996), Tschannen-Moran and Woolfolk Hoy (in press) sought to develop the OSTES as an instrument that possessed correspondence

to the tasks that teachers faced in school. Beginning with an unpublished teacher efficacy instrument developed by Bandura, the authors developed and added their own items as part of a graduate seminar in teacher efficacy. Focus was on inclusion of statements representative of frequent teaching activities. Following Bandura's lead, the OSTES employs a 9-point Likert scale.

The initial OSTES was administered to 121 teachers, 59 of which were preservice (Tschannen-Moran, 2000). This instrument was then refined through exploratory principal components analysis and a one-factor solution was presented (eigenvalue = 21.24) that explained 41% of the matrix of association variance. Unfortunately, the criteria used for determining the number of factors to retain was not reported, and therefore, it is unclear whether one factor emerged or was forced on the data. Nevertheless, all but three of the 52 items had factor pattern coefficients greater than .40. In the interest of parsimony, only those items with pattern coefficients of .60 or higher were retained, resulting in the initial 36-item OSTES (coefficient alpha for scores was .97). The authors did not report the variance-accounted-for by the single factor solution to the retained 36 items, but one would expect it to be larger than the 41% noted above.

In a later study, Tschannen-Moran and Woolfolk Hoy (in press) reported two rounds of principal axis factor analyses conducted on scores from independent samples. Their Study 1 represented an extension of the study noted above (*n* = 121) in which the authors gathered additional data, resulting in a combined total of 224 teachers (146 preservice). This analysis reflected another reduction of the full 52 items, except this time 32 items (rather than 36) were retained based on responses from all 224 respondents. Ten factors with eigenvalues greater than one emerged, and the first factor explained 39.9% of the variance (eigenvalue = 20.7). Items with pattern coefficients of .60 or higher (with one exception, coef. = .595) on the first factor were retained for Study 2, leaving 32 items for further analysis.

Study 2 involved an investigation of the 32-item version of the OSTES with 217 teachers (70 preservice). According to the authors (Tschannen-Moran & Woolfolk Hoy, in press), principal axis factor extraction was used and eight eigenvalues were greater than one. The scree plot, however, suggested a possible two or three factor solution. After examining both solutions, the three factor version was used and an 18-item version was retained that purported to measure three factors (51.0% variance explained in Study 2, 57.0% variance explained collapsing Study 1 and Study 2 samples): Efficacy in Study Engagement (8 items),

Efficacy in Instructional Practices (7 items), and Efficacy in Classroom Management (3 items). These factors had interfactor correlations of .59, .60, and .64. Score reliabilities were .82, .81, and .72, respectively. Convergent and discriminant validity coefficients provide some support for the construct validity of scores.

Because the interfactor correlations in the Tschannen-Moran and Woolfolk Hoy study (in press) were moderate, the authors conducted a second-order factor analysis, in which all factors collapsed into one factor with pattern/structure coefficients ranging from .74 to .84. Tschannen-Moran and Woolfolk Hoy argued that the OSTES could be used for assessment of the three domains of efficacy or to yield a more generalized efficacy score.

Based on these exploratory factor analysis results, the OSTES appears promising in the measurement of teacher efficacy. However, two points of caution are worth noting. First, the third factor (Efficacy in Classroom Management) was defined with only three items, with one item possessing a marginal pattern coefficient (.39) in one of the analyses. Second, and more importantly, the eigenvalues for the third factor were consistently borderline across analyses regarding their ability to survive a parallel analysis.

Parallel analysis (Horn, 1965; Turner, 1998) has been shown to be among the most accurate methods for determining the number of factors to retain (Zwick & Velicer, 1986) and generally superior to the scree plot and eigenvalue greater than one rule, which were consulted by Tschannen-Moran and Woolfolk Hoy (in press) when making factor retention decisions. For four studies employing the 18 item OSTES, Tschannen-Moran and Woolfolk Hoy reported eigenvalues for the third factor as 1.40 (Study 2), 1.10 (Full Sample), 0.97 (Preservice teachers), and 1.24 (Inservice teachers). Henson (2001) compared these eigenvalues to random eigenvalues derived from (_n_ X 18) random data matrices for a parallel analysis (Thompson & Daniel, 1996), and reported that only the first study (Study 2) legitimately retained the third factor.

The third eigenvalues in the other studies were all less than the random eigenvalues. Furthermore, Henson (2001) noted that had a parallel analysis been conducted, even the _second_ factor in the Inservice teacher sample would not have been retained as the second eigenvalue (1.04) did not surpass the random eigenvalue. These findings suggest that the presence of a third factor in the data may be questionable. The lower reliability coefficient (.72) for scores on the Classroom Management factor also points to this possibility.

Tschannen-Moran and Woolfolk Hoy's (in press) strong

exploratory factor analysis pattern coefficients, variance explained, and validity results imply that the OSTES may be useful as a measure of teacher efficacy. However, the above findings are ambiguous as to (a) whether teacher efficacy is a one-factor or multidimensional construct, (b) how many factors may actually exist in the data collected by Tschannen-Moran and Woolfolk Hoy, and (c) whether these factors are most appropriately modeled as being correlated. The present study investigated the construct validity of each of these competing models and makes suggestions for future refinement of the instrument based on a confirmatory factor analysis approach to model testing.

Participants

The participants used for testing this instrument were drawn from 183 inservice teachers in Texas and Washington, D.C., most of which taught primary grades. Data were collected in cooperation with Baylor College of Medicine's (Houston, TX) Center for Educational Outreach. Teachers' experience ranged from 1 to 23 years.

Confirmatory Factor Analysis

Although Tschannen-Moran (2000) and Tschannen-Moran and Woolfolk Hoy (in press) utilized exploratory factor analysis (EFA) as their method of inquiry, we chose confirmatory factor analysis (CFA) over EFA because a strong hypothesis was

developed before data investigation was conducted. In situations where researchers have developed theories, CFA often is regarded as a stronger alternative to EFA. Gorsuch (1983) noted, "whereas the former [EFA] simply finds those factors that best reproduce the variables under the maximum likelihood conditions, the latter [CFA] tests specific hypothesis regarding the nature of the factors" (p. 129). Furthermore, Muliak (1998) gave a strong criticism of EFA and claimed that "the continued preoccupation in the exploratory factor analysis literature with the search for *optimal* methods of determining the number of factors, of determining the pattern coefficients, and of rotating the factors, in the general case, reveals the inductivist aims that many have to make this method find either optimal or incorrigible knowledge" (p. 265). In short, CFA is a theory-testing procedure, whereas EFA is a theory-generating procedure (Stevens, 1996). The process of repeated attempts at theory falsification is a time-honored tradition in theory development (Thompson and Daniel, 1996). As Moss (1995) noted,

> A "strong" program of construct validation requires an explicit conceptual framework, testable hypotheses deduced from it, and multiple lines of relevant evidence to test the hypotheses. Construct validation is most efficiently guided by the test of "plausible rival hypotheses" which suggest credible alternative explanations or meanings for

> the test score that are challenged and refuted by the evidence collected. . . . Essentially, test validation examines the fit between the meaning of the test score and the measurement intent, whereas construct validation entails the evaluation of an entire theoretical framework. (pp. 6-7)

CFA was chosen because it allows for the testing of competing models or hypotheses. By comparing several different fit indices as well as chi-square statistics, researchers can test assumptions about competing models and determine which model has the best fit of the obtained data. All data were input into AMOS 4.0 (Arbuckle, 1999).

Results

The first model tested was the original 36-item one-factor solution proposed by Tschannen-Moran (2000). Because this model was subsequently abandoned, we have only presented the fit indices here and have not included additional parameter estimates. The complete instrument is given in the Appendix. Table 1 presents the fit indices, criteria used for evaluation of the indices, and the coefficient alpha for the obtained scores. In agreement with results from Tschannen-Moran and Woolfolk Hoy (in press), fit indices of the one-factor solution of the 36-item instrument led us to reject this model.

Insert Table 1 About Here

We then examined the hypothesized three-factor solution proposed by Tschannen-Moran and Woolfolk Hoy (in press) for their 18 items. In this subsequent solution, the three factors are defined by the following items: Efficacy in Student Engagement (items 1, 5, 11, 12, 19, 24, 25, and 26); Efficacy in Instructional Strategies (items 16, 17, 18, 29, 33, 35, and 36); Efficacy in Classroom Management (items 4, 7, and 28).

In the three-factor model, we allowed each of the latent factors to correlate because Tschannen-Moran and Woolfolk Hoy (in press) reported moderate interfactor correlations in their EFA. We chose to model these correlations despite the fact that the OSTES authors used an orthogonal (varimax) rotation. The model specification for this CFA is represented in Figure 1 (along with parameter estimates) and fit indices and coefficient alphas are presented in Table 2. Although the CFI indicated relatively good data fit, we decided to abandon this model because all other fit indices were relatively low (Dickey, 1996; Roberts, 1999; Stevens, 1996).

Insert Figure 1 and Table 2 About Here

To test the unidimensionality of the OSTES, we then investigated whether or not the original one-factor solution hypothesized with the 36-item instrument would test well with

the 18-item instrument. The model specification and parameters estimates are presented in Figure 2. Table 2 presents fit indices and reliabilities. The fit indices from the one-factor model also indicated some problems in data fit.

Accordingly, three other hypothesized models were tested. These models were developed based on the generally weak third factor results observed in the Tschannen-Moran and Woolfolk Hoy (in press) study and Henson's (2001) parallel analysis. Because the third factor (Efficacy in Classroom Management) appeared poorly defined in the EFA, we hypothesized that these three items (4, 7, and 28) should be dropped out of the analysis and a new two-factor model with correlated latent factors should be tested. The resulting model and parameter estimates are illustrated in Figure 3.

Insert Figures 3 - 5 About Here

As can be seen from Table 2, dropping these three items increased fit indices overall and made for better data fit. However, modification indices from the two-factor model indicated that there was a high modification index (19.239) for correlating the error variances between items 35 and 36. Rather than correlating the error variances, which is difficult to interpret without a theoretical expectation for why the errors should be related, we decided to test an additional model that

excluded item 35. Results from this model can be seen in Table 2 and Figure 4.

This fourth model had the best fit of all models tested. However, because the correlation between the two latent factors was high at .888, we decided to test one additional model that hypothesized a one-factor model that excluded the Classroom Management factor (items 4, 7, 28) and item 35. Results from this model are presented in Table 2 and Figure 5.

Although the one-factor model has better fit than the originally hypothesized three-factor model, the two-factor correlated model that excludes item 35 (Figure 4) appeared to have the best fit to the data of the five models. Most fit indices closely approached their declared criterion, and are indicative of reasonable model fit to the data. This model retains the Efficacy in Student Engagement and Efficacy in Instructional Strategies (minus item 35) factors largely intact, but eliminates the weakest factor observed in the Tschannen-Moran and Woolfolk Hoy (in press) study. The present results suggest that the reliable replication of this third factor across studies is unlikely, and therefore we recommend that it be omitted from the OSTES.

Discussion

Historically, the study of teacher efficacy has suffered from poor construct validity. The predominant instrument used to

assess teacher efficacy, the Teacher Efficacy Scale (Gibson & Dembo, 1984), also had several psychometric weakness. Because the TES was never submitted to confirmatory or cross-validation scrutiny (despite calls for such from the test authors), it was adopted as the instrument of choice in many teacher efficacy studies, leading Ross (1994, p. 382) to label it a "standard" instrument in the field.

Recently however, there have been several important advances in the field on both substantive and measurement grounds. The teacher efficacy construct has undergone serious scrutiny and new theoretical models have emerged. Several promising instruments have been developed, including the OSTES, which was examined in the present study.

The present confirmatory factor analysis results support the factorial validity (Thompson & Daniel, 1996) of the OSTES, but only for the Efficacy in Student Engagement and Efficacy in Instructional Strategies factors. Furthermore, we found evidence that these factors were highly correlated, which mirrors Tschannen-Moran and Woolfolk Hoy's (in press) results and supports their use of a higher-order analysis to create a single general efficacy factor. Nevertheless, the models tested in the present study do indicate the presence of two factors rather than unidimensionality.

Importantly, the Efficacy in Classroom Management factor did not withstand the CFA. We expected this outcome given the generally weak eigenvalues reported for this factor by Tschannen-Moran and Woolfolk Hoy (in press) and we recommend that this factor be deleted from future studies using the OSTES.

A brief caveat is warranted to place this finding within methodological context and as a possible guide for future efficacy research. Historically, teacher efficacy instrumentation has been dominated with EFA methodology. Henson (2001) and Roberts (1999) called for more confirmatory methods, and the present study is consistent with this expectation.

However, when EFA methods are used, there are myriad decisions the researcher must make during the process (cf. Gorsuch, 1983). One very important decision is the number of factors to extract. The number of extracted factors impacts the magnitude of the factor pattern and/or structure coefficients, and therefore can directly impact interpretation. There are many extraction rules one can consult, including the eigenvalue greater than one rule (Kaiser, 1960), scree plot (Cattell, 1966), minimum average partial correlation (Velicer, 1976), Bartlett's chi-square test (Bartlett, 1950, 1951), and parallel analysis (Horn, 1965; Turner, 1998). In an <u>empirical</u> review of EFA reporting practices, Henson and Roberts (in press) noted that the

eigenvalue rule is clearly the most commonly employed rule followed by the scree plot. The other rules are seldom used.

Unfortunately, as demonstrated by Zwick and Velicer (1986), the eigenvalue rule almost always overestimates the number of factors present in the data. The scree plot is more accurate but parallel and minimum average partial analyses were demonstrated to be much superior, with parallel analysis getting the nod as the most accurate decision rule.

Research on teacher efficacy instruments has heavily depended on the eigenvalue rule, and as such, may have exhibited a tendency to extract too many factors. This problem likely results in the retention of psychometrically and theoretically weak factors, which are not likely to be invariant across studies. This dynamic was observed in the present study concerning the Efficacy in Classroom Management factor of the OSTES. We would anticipate that this third factor would be poorly replicated in EFAs of future samples.

The present results also support a multidimensional conceptualization of teacher efficacy. However, this statement must be tempered by the high correlation between the observed factors in the two-factor model. While practically all former measures of efficacy were conceptualized as having more than one dimension (usually two), recent literature suggests that teacher efficacy may be unidimensional (cf. Deemer & Minke, 1999;

Goddard et al., 2000). Consistent with recent research, Tschannen-Moran and Woolfolk Hoy (in press) demonstrated that their three factors could collapse into one higher-order g factor. The present CFA results are inconclusive as regards this issue. The two-factor (revised) model provided best data fit but the one-factor (revised) was not far behind, suggesting that in some samples the one-factor model may indeed by as strong as the multidimensional framework. We would emphasize, however, that the question of whether teacher efficacy is uni- or multidimensional likely oversimplifies the nature of the construct. Furthermore, other analytic methods, such as higher-order analyses, could be used to explore hierarchal dimensions of self-efficacy, much like the dimensional work of personality theorists (Henson, 2001).

In sum, the present results provided CFA support for a two-factor OSTES (14 items). Accordingly, future instrument refinement is warranted with the possible elimination (or redesign) of the Efficacy in Classroom Management factor. Finally, more appropriate EFA methodology is needed in instrument development and more CFA methodology is needed in instrument validation. This is particularly true for teacher efficacy research.

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Table 1

Fit Indices and Coefficient alpha for the One-Factor Solution of the 36-item Instrument

	One-Factor Model of 36-Item Instrument	Criterion
Fit Measure	Value	Value
Chi Square	1527.855	
Df	594	
CFI	.749	> .95 (Bentler, 1990)
PCFI	.706	> .90 (Marsh & Hu, 1998)
NFI	.648	> .90 (Bentler & Bonet, 1980)
GFI	.647	> .95 (Thompson, 1998)
AGFI	.604	> .90 (Thompson, 1998)
RMR	.153	< .05 (Byrne, 1998)
RMSEA	.093	< .08 (Browne & Cudeck, 1993)
alpha	.955	

Table 2

Fit Indices for Models with the 18-item Instrument

	Three-Factor correlated	One-Factor model	Two-Factor correlated	Two-Factor correlated (minus item 35)	One-Factor (minus items 4, 7, 28, and 35)
Fit Measure	Value	Value	Value	Value	Value
Chi Square	265.519	373.693	171.920	136.831	164.191
Df	132	135	89	76	77
CFI	.917	.851	.936	.947	.924
PCFI	.791	.751	.794	.791	.782
NFI	.849	.787	.878	.889	.867
GFI	.861	.797	.887	.901	.877
AGFI	.820	.743	.848	.863	.833
RMR	.121	.144	.106	.105	.117
RMSEA	.075	.099	.072	.066	.079
alphas:					
Factor I	.866	.927[a]	.866	.866	.914[a]
Factor II	.877		.877	.853	
Factor III	.786				

Note. Factor I = Efficacy for Student Engagement, Factor II = Efficacy for Instructional Strategies, Factor III = Efficacy for Classroom Management.

[a] Coefficient alpha corresponds to all collapsed factors, not to Factor I only.

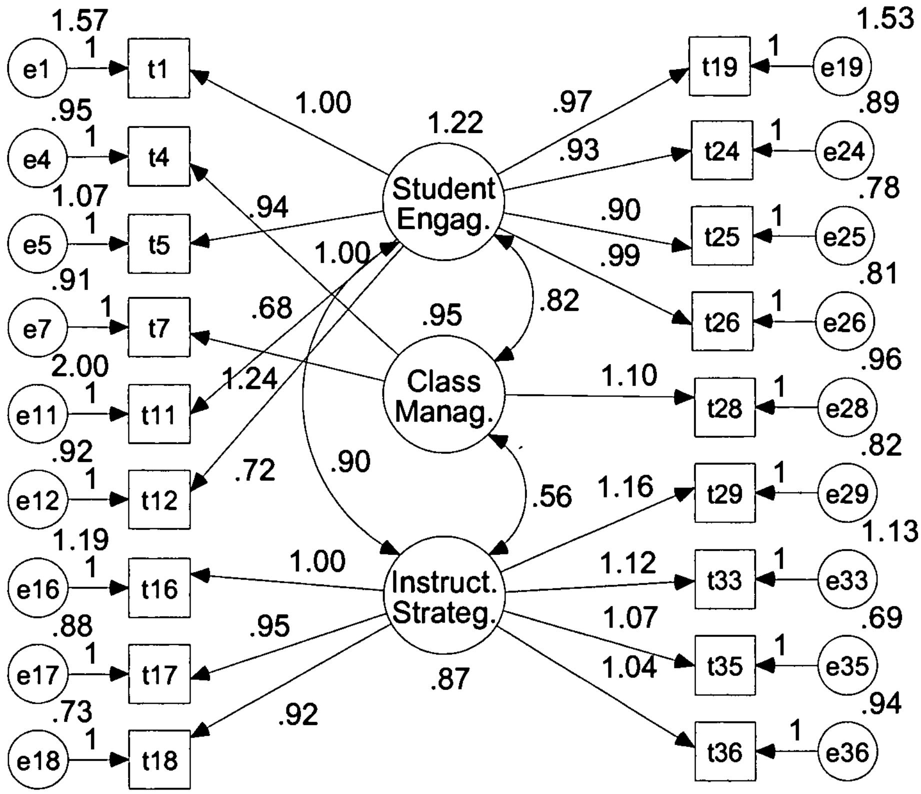

Figure 1. Correlated three-factor model of the 18-item instrument with unstandardized estimates.

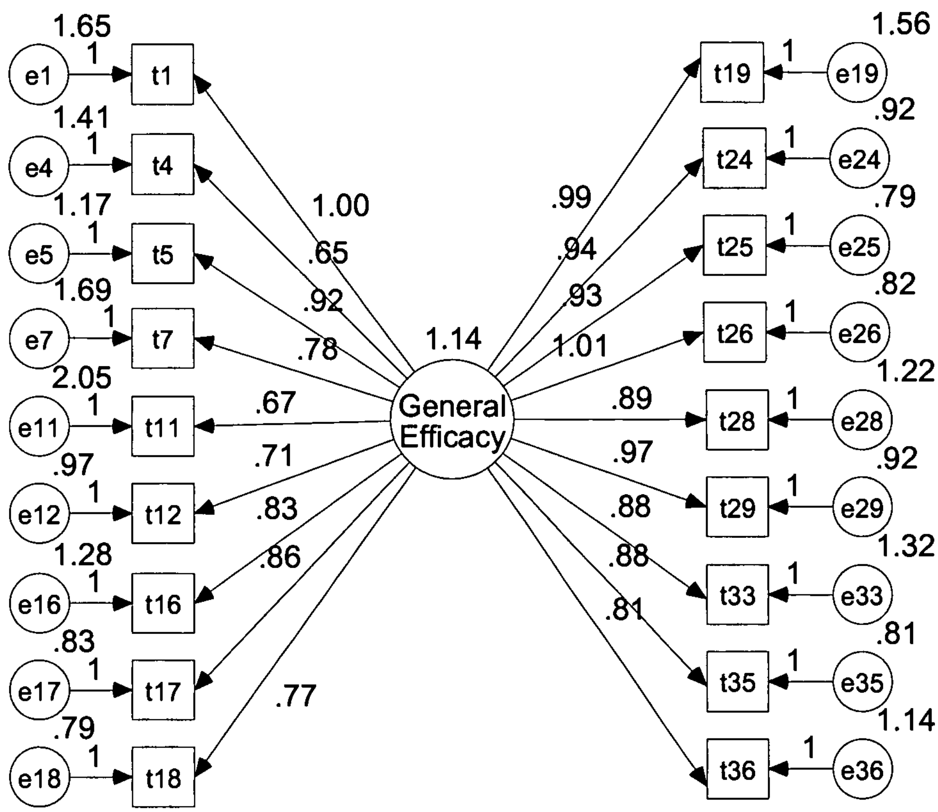

Figure 2. One-factor model of the 18-item instrument with unstandardized estimates.

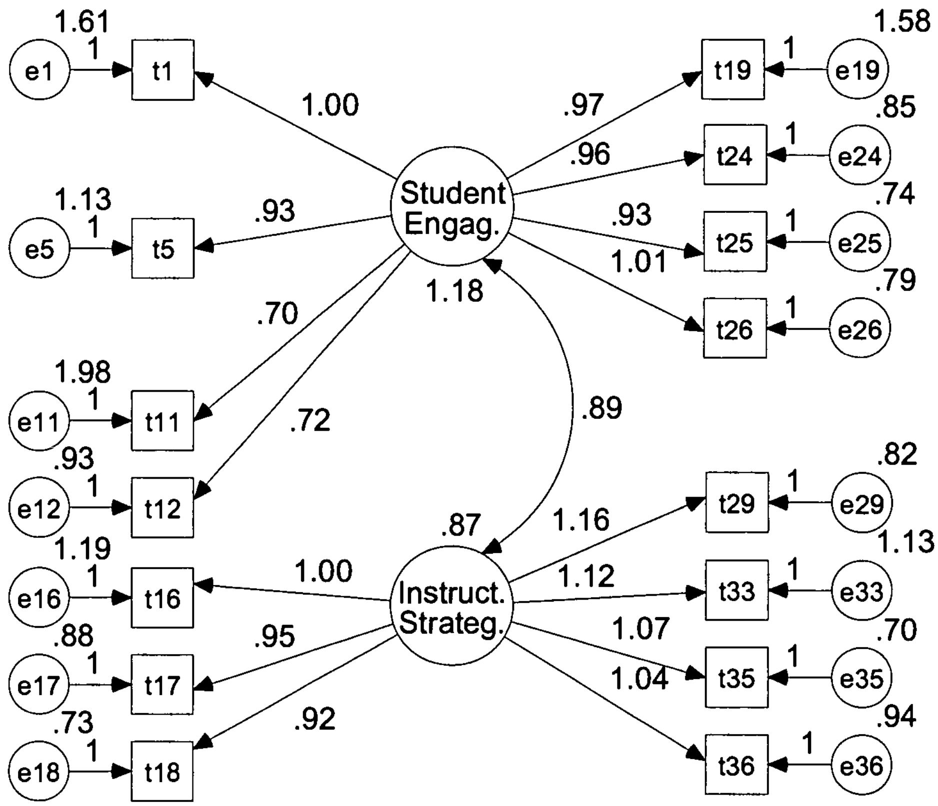

Figure 3. Correlated two-factor model of the 18-item instrument (minus items 4, 7, and 28) with unstandardized estimates.

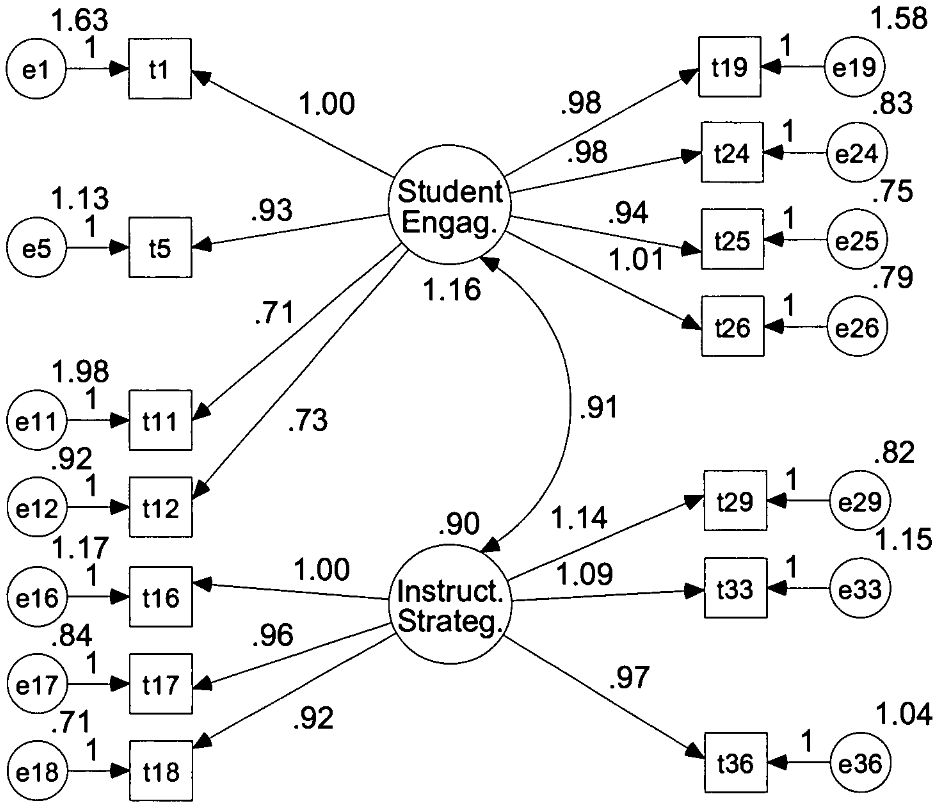

Figure 4. Correlated two-factor model of the 18-item instrument (minus items 4, 7, 28, and 35) with unstandardized estimates.

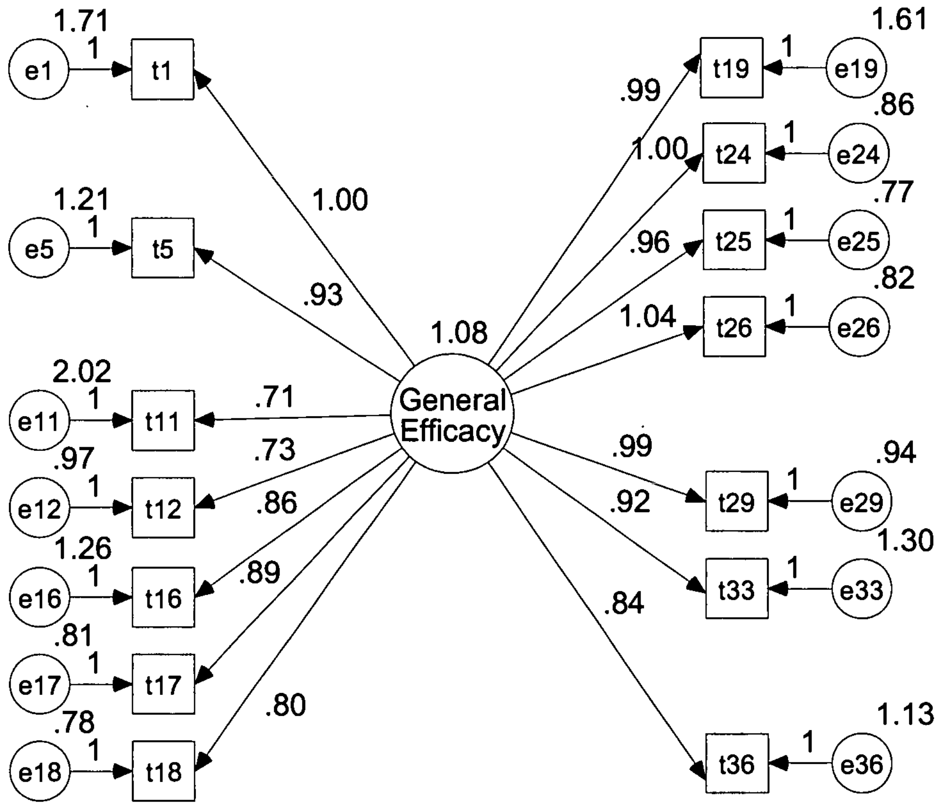

Figure 5. One-factor model of the 18-item instrument (minus items 4, 7, 28, and 35) with unstandardized estimates.

Teacher Beliefs

How much can you do?

Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

		Nothing		Very Little		Some Influence		Quite A Bit		A Great Deal
1.	How much can you do to get through to the most difficult students?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
2.	How much can you do to increase students' memory of what they have been taught in previous lessons?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
3.	How much can you do to keep students on task on difficult assignments?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
4.	How much can you do to get children to follow classroom rules?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
5.	How much can you do to motivate students who show low interest in schoolwork?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
6.	How much can you do to get students to work together?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
7.	How much can you do to control disruptive behavior in the classroom?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
8.	How much can you do to overcome the influence of adverse community conditions on students' learning?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
9.	How much can you do to make your classroom a safe place?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
10.	How much can you do to make students enjoy coming to school?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
11.	How much can you assist parents in helping their children do well in school?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
12.	How much can you do to get students to believe they can do well in school work?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
13.	How much can you do to get students to trust you as a teacher?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
14.	How much can you do to make parents feel comfortable coming to school?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
15.	How much can you do to reduce class absenteeism?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
16.	How much can you do to insure that your assessment strategies accurately evaluate student learning?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
17.	To what extent are you able to create lessons that hold students' interest?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
18.	How much can you gauge student comprehension of what you have taught?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
19.	To what extent can you influence the self-discipline of your students?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
20.	To what extent are you able to tailor your lessons to the academic level of your students?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
21.	To what extent are you able to maximize instructional time?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
22.	How much can you do to adjust your lessons to meet the needs of individual students?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
23.	How much can you do to meet the needs of a diverse student body?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
24.	How much can you do to overcome a student's resistance to a particular subject?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
25.	How much can you do to repair student misconceptions?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
26.	How much can you do to improve the understanding of a student who is failing?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
27.	How much can you do to influence student performance?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
28.	How much can you do to calm a student who is disruptive or noisy?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
29.	How much can you do to adjust your lessons to the proper level for individual students?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
30.	How much can you do to influence how well your students do on standardized tests?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
31.	How much can you do to help students with behavior difficulties?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
32.	How much can you do to deal with students with learning difficulties?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
33.	How much can you use a variety of assessment strategies?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
34.	To what extent can you insure that students understand your rationale for grading?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
35.	To what extent can you vary teaching strategies to best communicate information to your students?	①	②	③	④	⑤	⑥	⑦	⑧	⑨
36.	How well can you implement alternative strategies in your classroom?	①	②	③	④	⑤	⑥	⑦	⑧	⑨

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